LAB # 7

IMPLEMENTATION OF WHILE AND DO-WHILE LOOP STRUCTURE

While Loop

A while loop statement repeatedly executes a target statement as long as a given condition is true.

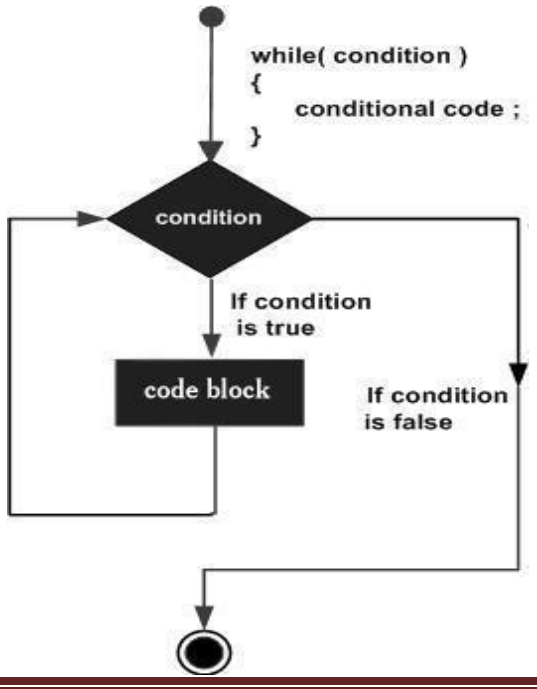
Syntax

The syntax of a while loop in C++ is –

```
while(condition) {
statement(s);
}
```

Here, statement(s) may be a single statement or a block of statements. The condition may be any expression, and true is any non-zero value. The loop iterates while the condition is true. When the condition becomes false, program control passes to the line immediately following the loop.

Flow Diagram



Here, key point of the while loop is that the loop might not ever run. When the condition is tested and the result is false, the loop body will be skipped and the first statement after the while loop will be executed.

Example

```
#include <iostream>
using namespace std;

int main ()
{
        // Local variable declaration:
        int a = 10;
        // while loop execution
        while( a < 16 ) {
        cout << "value of a: " << a << endl;
        a++;
        }
        return 0;
}
```

When the above code is compiled and executed, it produces the following result −

```
value of a: 10
value of a: 11
value of a: 12
value of a: 13
value of a: 14
value of a: 15
```

C++ Do/While Loop

Unlike for and while loops, which test the loop condition at the top of the loop, the do...while loop checks its condition at the bottom of the loop. A do...while loop is similar to a while loop, except that a do...while loop is guaranteed to execute at least one time.

Syntax

The syntax of a do...while loop in C++ is −

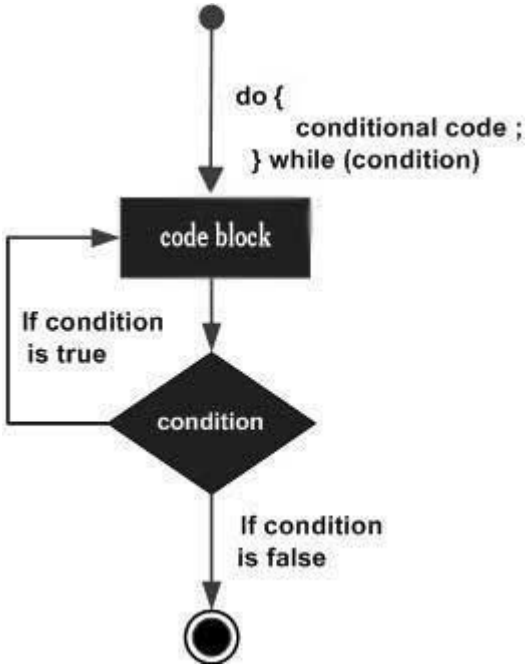
```
do {
statement(s);
}
while( condition );
```

Notice that the conditional expression appears at the end of the loop, so the statement(s)

in the loop execute once before the condition is tested.

If the condition is true, the flow of control jumps back up to do, and the statement(s) in the loop execute again. This process repeats until the given condition becomes false

Flow Diagram



Example

```
#include <iostream>
using namespace std;
int main ()
{
        // Local variable declaration:
        int a = 10;
        // do loop execution
        do {
        cout << "value of a: " << a << endl;
        a = a + 1;
        } while( a < 16 );
        return 0;
}
```

When the above code is compiled and executed, it produces the following result −

```
value of a: 10
value of a: 11
```

value of a: 12
value of a: 13
value of a: 14
value of a: 15

C++ Nested Loops

A loop can be nested inside of another loop. C++ allows at least 256 levels of nesting.

Syntax

1) The syntax for a nested while loop statement in C++ is as follows −

```
while(condition) {
while(condition) {
statement(s);
}
statement(s); // you can put more statements.
}
```

2) The syntax for a nested do...while loop statement in C++ is as follows −

```
do {
statement(s); // you can put more statements.
do {
statement(s);
} while( condition );
} while( condition )
```

Example of Nested while loop

C++ program to print the number pattern.

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

```
#include <iostream>
#include <conio.h>
using namespace std;
int main()
{
        int i=1,j;
        while (i <= 5)
        {
        j=1;
```

```
        while (j <= i )
        {
        cout <<j;
        j++;
        }
        cout << endl;
        i++;
        }
        getch();
        return 0;
}
```

Lab Tasks

1- Write a program that prints the first 50 even numbers by using while loop.

2- Write a program that checks whether a number is prime or not by using if elsestructure and while loop.

3- Write a program to calculate the factorial of any number using while loop.

4- Develop a program to perform two simple transactions in a bank as long as user enters y/Y. to continue.

Enter your ID: ****	Main Menu ********** 1. Deposit Money 2. Withdraw Amount 3. Login as Different User Select your choice ….	*(after completing the selected transaction)* Do you want to continue? [y/Y] _ *(goes to Main Menu, if y/Y is pressed)*

5- Write only the necessary statements to print all the numbers in the range 100 - 150 which are divisible by 4 (tab separated), using while loop.

6- Write a program that takes a positive integer (<9999) as input and expresses the number in words. Use do-while loop

Input: Enter a positive integer (less than 9999) : 6342

Output: 6 thousand 3 hundred 4 tens and 2 ones